

REMARKS

Claims 1-8 are active in the application. Claims 4-6 have been allowed. Claims 7 and 8 were objected to for being dependent on a rejected base claim. This amendment is believed to place the application in *prima facie* condition for allowance.

Claims 1-3 were rejected under 35 USC 103(a) as being unpatentable over US Patent 5,886,946 to Ooishi in view of US patent 6,198,322 to Yoshimura. This rejection is traversed.

The present invention provides a delay lock loop (DLL) circuit that has exceptionally high power efficiency at low operating frequencies. Power consumption is reduced at low operating frequencies by reducing operating current supplied to a differential amplifier when the DLL circuit operates at low frequency. This aspect of the invention is explained in the present specification at page 6, lines 1-6, page 28, lines 6-13, and at page 5, lines 12-25. It is important to note that the current supplied to the differential amplifier is reduced when the operating frequency is low.

Accordingly, claim 1 has been amended to clarify that the current received by the differential amplifier is operating current (as distinct from signals received at inverting or noninverting inputs, which are amplified). The operating current is the current required for operating (i.e. powering) the differential amplifier. The operating current does not comprise a signal that is amplified, monitored, or in any other way processed by the amplifier. The new term “operating” in claim 1 was implied in the prior communication and in the present specification and hence the new term should be considered to be merely of a clarifying nature, and would not present any new issues.

Ooishi et al. does not teach a differential amplifier that receives operating current from a current source that is responsive to an operating frequency of the DLL circuit.

The Office Action argues that Ooishi et al. in Fig. 30 teaches a differential amplifier 804 receiving current from the frequency-responsive current source. This is wrong. The inverting input (-) of the differential amplifier is a high impedance input, and it therefore accepts only an infinitesimal amount of current. It is not reasonable or accurate to describe the inverting input (-) of the differential amplifier 804 as “receiving current from the current

source”, as recited in the prior version of claim 1 before the present amendment. The inverting input (-) is responsive to applied voltage, not current. The vast majority of the current from the current source 54 flows to the ring oscillator 114. In Col. 19, lines 54-65, Ooishi et al. explains that the ring oscillator 114 is controlled by the amount of current it receives. Hence, the current from the current source 54 controls the ring oscillator 114.

The differential amplifier 804 of Ooishi et al. monitors and controls the voltage at the ring oscillator 114. Specifically, from inspection of Fig. 30 and associated text, the amplifier 804 receives a reference voltage at the non-inverting input (+). The inverting input (-) is connected to the amplifier output and to the power supply of the ring oscillator 114. This circuit configuration is well known for providing an adjustable, stable voltage equal to the reference voltage at the noninverting input (+). The differential amplifier 804 inverting input (-) is connected to the output of the current source 54 and thereby monitors the voltage of the current source and ring oscillator power input.

The differential amplifier 804 does not receive operating current from the current source 54. The inverting input (-) is a signal input. The inverting input (-) is not a port for receiving operating current or power. In fact, Ooishi et al. is silent with regard to the power or current source for powering or operating the differential amplifier. The operating power connections for the differential amplifier 804 are not illustrated or described by Ooishi et al. Ooishi et al. does not teach or suggest varying the operating current or any other current source to the differential amplifier as a function of frequency. Accordingly, the rejection of claim 1 is erroneous and must be withdrawn.

Yoshimura describes a DLL circuit. However, like Ooishi et al., Yoshimura lacks the essential feature of providing operating current to a differential amplifier from a current source that is responsive to frequency. Additionally, Yoshimura also does not teach or suggest varying the operating current or any other current source to the differential amplifier as a function of frequency. Hence, no conceivable combination of Ooishi et al. and Yoshimura can possibly provide a DLL circuit with a differential amplifier that receives a frequency-dependent amount of operating current. Accordingly, claim 1 cannot be produced by any conceivable combination of Ooishi et al. and Yoshimura, and would therefore not make claim 1 obvious to one of ordinary skill in the art. Claim 1 is novel, and would be

unobvious to one of ordinary skill in the art, because it recites the essential feature of a differential amplifier (in a DLL circuit) that receives an amount of operating current that changes with frequency.

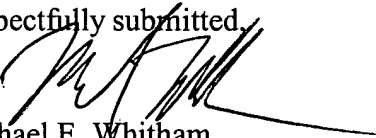
Regarding claim 2, Ooishi et al. does not teach or suggest two separate bias generation circuits, with the first bias circuit producing a constant current, and the second bias circuit producing a correction signal in response to a signal frequency.

In view of the foregoing, it is respectfully requested that the application be reconsidered, that claims 1-8 be allowed, and that the application be passed to issue.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

A provisional petition is hereby made for any extension of time necessary for the continued pendency during the life of this application. Please charge any fees for such provisional petition and any deficiencies in fees and credit any overpayment of fees for the petition or for entry of this amendment to Attorney's Deposit Account No. 50-2041 (Whitham, Curtis & Christofferson P.C.).

Respectfully submitted,



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